al. (U.S. Patent 5,898,544), and claims 12 and 14-15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Krinke et al.

The Applicant would like the Examiner to note that the amendments to claims 1, 5, 8, 11, and 13 do not change the scope of the invention, nor do they preclude an application of the doctrine of equivalents. The amendments to claims 1, 5, 8, 11, and 13 are not related to the statutory requirements of patentability (unless expressly state herein) and were not made for the purpose of narrowing the scope of those claims.

Claim Rejection-35 U.S.C. §112

Claims 5 and 6 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. The Applicant has amended claims 5 and 6 to cure the Examiner's indefiniteness concern.

Regarding claim 6, the Examiner stated "it is not clear how the first section load beam and the second section load beam are connected to the flexure at the same time." The Applicant duly notes the Examiner's statement and has amended claim 6 to more clearly define the relationship between the load beam, the flexible beam and the flexure.

Claim Rejection-35 U.S.C. §102(e)

Claims 1-11, 13, and 16-17 were rejected under 35 U.S.C. §102(e) as being anticipated by Krinke et al. (U.S. Patent No. 5,898,544).

In regards to claim 1, it is respectfully submitted that the cited reference does not disclose the invention as claimed. Claim 1 recites a microactuator for selectively altering a position of a transducing head carried by a slider in a disc drive system with respect to a track of a rotatable disc having a plurality of concentric tracks. The disc drive system has an actuator arm attached to a load beam for supporting the slider over the rotatable disc and the load beam has a stationary region and a moving region. The microactuator comprises means for flexibly coupling the stationary region of the load beam to the moving region of the load beam and means for selectively altering a position of the slider with respect to the rotatable disc. The means for selectively altering extend

from the distal end of the stationary region to a proximal end of the moving region generally along a longitudinal center line of the stationary region.

Claim 1 contains two elements, the both of which are set forth in means-plus-function form, as prescribed by 35 U.S.C. §112, paragraph 6. Therefore, these elements must be interpreted as limited to the corresponding structure described in the specification and equivalence thereof. See MPEP 2181, citing *In re Donaldson Co.*, 29 U.S.P.Q.2d (BNA) 1845 (Fed. Cir. 1994).

The first element of claim 1 recites "means for flexibly coupling the stationary region of the load beam to the moving region of the load beam." The corresponding structure for this means is defined in the specification and drawings of the present application as a flexible beam 48. The flexible beam 48 connects the stationary region of the load beam to the moving region of the load beam.

The second element of claim 1 recites "means for selectively altering a position of the slider with respect to the rotatable disc, the means extending from the distal end of the stationary region to a proximal end of the moving region generally along a longitudinal center line of the stationary region." The corresponding structure for the means for selectively altering is defined in the specification and drawings of the present application as a bending motor mounted to the flexible beam. The flexible beam is the structural element which connects the stationary region of the load beam to the moving region of the load beam, whereas the bending motor is the actuating element which extends from the stationary region to the moving region generally along a longitudinal center line of the stationary region. The bending motor operates as a bendable cantilever to alter the position of the moving region with respect to the stationary region and effect high resolution positioning of the transducing head.

Because the first and second elements of claim 1 (means for flexibly coupling and means for selectively altering) are set forth in means-plus-function language, corresponding structure disclosed in the specification for flexibly coupling and selectively altering (as described above), including structural equivalence thereof, must be taken into account in construing the scope of the claim elements. See MPEP 2181. In order for a prior art reference to anticipate claim 1, the

reference must teach an element that performs the identical functions specified in the claim. Furthermore, the structure of the prior art element must be the same as or equivalent to the structure described in the specification which corresponds to the claimed means-plus-function. See MPEP 2182. Therefore, in order to anticipate claim 1, Krinke et al. must disclose a structure which is the same as or equivalent to the present invention.

One of the factors to be considered in deciding structural equivalence is whether the prior art element performs the function specified in the claim in substantially the same way, and produces substantially the same results as the corresponding element disclosed in the specification. See MPEP 2184, citing *Lockheed Aircraft Corp. v. United States*, 193 U.S.P.Q. (BNA) 461 (Ct. Cl. 1977). The concepts of equivalence (function-way-result test) as set forth in *Graver Tank & Mfg. Co. v. Linde Air Products,* 85 U.S.P.Q. (BNA) 328 (1950), are relevant to any "equivalents" determination. See MPEP 2184, citing *Polumbo v. Don-Joy Co.*, 226 U.S.P.Q. 5, 8-9, 4 (Fed. Cir. 1985). Another factor to be considered is whether the differences between prior art elements and the structure disclosed in the specification are substantial. See MPEP 2184, citing *Warner-Jenkinson Co. v. Hilton Chemical Co.*, 41 U.S.P.Q.2d (BNA) 1865, 1875 (1997) and *Valmont Industries, Inc. v. Reinke Mfg. Co.*, 25 U.S.P.Q.2d (BNA) 1451 (Fed. Cir. 1993).

A comparison of the teachings of Krinke et al. to the structure disclosed in the present application reveals differences between the microactuator of the present application and the disc drive suspension of Krinke et al. that preclude a finding that the two systems are interchangeable or equivalent. Krinke et al. discloses a disc drive suspension including a load beam, a flexure, a linkage, and a microactuator. The load beam includes a mounting region at a proximal end of the load beam, a rigid region adjacent to a distal end of the load beam, a spring region between the mounting region and the rigid region, a stationary section including a first longitudinally extending arm and a second longitudinally extending arm with an opening region therebetween, and a moving section including a third longitudinally extending arm located in the open region between the first longitudinally extending arm and second longitudinally extending arm. The flexure is located at the distal end of the load beam and configured for receiving and supporting a read/write head. The

linkage is formed unitarily from the same sheet of material as the load beam and supporting the third longitudinally extending arm in the open region to allow the third longitudinally extending arm to transversely shift therein toward and away from the first longitudinally extending arm and the second longitudinally extending arm. The microactuator is mounted on the load beam and transversely shifts the third longitudinally extending arm in the open region toward and away from the first longitudinally extending arm and the second longitudinally extending arm such that the moving section of the load beam and the flexure move along a tracking axis with respect to the stationary section in response to tracking control signals.

Specifically, Krinke et al. teaches a disc drive suspension wherein the microactuator is located at the proximal end of the load beam for moving a substantial portion of the load beam (including the rigid region, the spring region and the moving section) with respect to the proximal end of the load beam.

Krinke et al. does not employ a bending motor attached to a flexible beam or an entirely moving part of the microactuator. The microactuator of Krinke et al. shown in FIG. 16 extends between a stationary portion and a moving portion of the loading beam, however, the microactuator is not part of the load beam that moves to position the transducing head. The bending motor of the present application extends between a moving region and a stationary region of the load beam and is attached to a flexible beam. The bending motor itself is bendable and moves in conjunction with the moving region of the load beam to position the transducing head. Of further importance, the present application discloses a microactuator which moves a slider attached to a flexure with a bending motor and flexible beam but the load beam (or at least a substantial portion of the load beam) is stationary, whereas the Krinke et al. patent discloses a disc drive suspension including a microactuator to move the load beam.

Additionally, Krinke et al. preferably places the microactuator further from the read/write head to reduce the likelihood that the microactuator tracking signals will interfere with the read/write processes. (Column 6, lines 48-52).

While the configuration in Krinke et al. does perform the claimed functions (means for flexibly coupling and means for selectively altering) as claim 1, the device does not perform these functions in substantially the same way or produce substantially the same results as the device disclosed in claim 1 of the present application. As a result there can be no structural equivalence. See MPEP 2184, citing *In re Bond* 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). Therefore, Krinke et al. does not anticipate claim 1, and the rejection of claim 1 under 35 U.S.C. §102(e) should accordingly be withdrawn.

Claim 2 of the present application recites a microactuator for selectively altering a position of a transducing head carried by a slider in a disc drive system with respect to a track of a rotatable disc having a plurality of concentric tracks and the disc drive system having an actuator arm. The microactuator comprises a load beam attached to a distal end of the actuator arm, the load beam having a first section. A flexure for supporting the slider carries the transducing head. A bending motor is attached between the first section of the load beam and the flexure, the bending motor being deformable in response to a control signal applied thereto.

Krinke et al. does not disclose, teach, or suggest the structure recited in claim 2. Claim 2 recites the structural details for a microactuator. Krinke et al. discloses a disc drive suspension including a load beam having a stationary region and a moving region. The microactuator of Krinke et al. is attached to the stationary region of the load beam to effect movement of the moving region of the load beam and thereby position the transducing head. The microactuator of Krinke et al. is not bendable and does not move with the moving region of the load beam. Furthermore, the microactuator is not attached to the flexure supporting the slider, but rather is attached to one section of the load beam. The microactuator of Krinke et al. does not form the connection between the stationary and moving sections as the bending motor does in the present invention. Finally, Krinke et al. discloses a load beam split into a moving region and a stationary region where a substantial portion of the load beam is comprised of the moving region. However, the load beam of claim 2 is not split into a moving section and a stationary section wherein the

moving section forms a substantial portion of the load beam, but rather the entire load beam is stationary.

Krinke et al. does not yield the present invention as defined by claim 2, thus the rejection of claim 2 under 35 U.S.C. §102(e) should be withdrawn.

Claim 13 of the present application as amended recites a disc drive suspension. The disc drive suspension includes an actuator arm having a proximal end and a distal end. A load beam attached to the distal end of the actuator arm, the load beam having a mounting region at a proximal end, a head suspension near a distal end of the load beam, and a flexible region between the mounting region and the head suspension. A flexure is configured to support a transducing head. A beam is connected between the head suspension and the flexure. A bending motor is attached to a top surface of the beam such that the beam supports the bending motor and transforms a force on the flexure into a compressive load on the bending motor, the bending motor being deformable in response to a control signal applied thereto.

Krinke et al. does not disclose, teach, or suggest the structure recited in amended claim 13 for the reasons described above with respect to claims 1 and 2. In addition, Krinke et al. does not disclose a microactuator attached to the bendable portion (beam) forming part of the moving portion of the load beam. Accordingly, the rejection of claim 13 under 35 U.S.C. §102(e) should be withdrawn.

Claims 2-11 depend from claim 2 and claims 16-17 depend from claim 13, therefore claims 2-11 and 16-17 are allowable therewith.

<u>Claim Rejection 35 U.S.C. §103(a)</u>

Claims 12 and 14-15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Krinke et al. Claim 12 depends from claim 2 and is allowable therewith. Claims 14-15 depend from claim 13 and are allowable therewith. The rejection of claims 12 and 14-15 under 35 U.S.C. §103(a) should accordingly be withdrawn.

Respectfully submitted,

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APPENDIX:
MARKED UP VERSION OF SPECIFICATION AND CLAIM AMENDMENTS

SPECIFICATION

In a second preferred embodiment of the present invention, the bending motor 32 is constructed using an oppositely poled piezoelectric element. In this embodiment, the piezoelectric element is poled in one direction on a first longitudinal half and is poled in the opposite direction on the other longitudinal half. In this embodiment, only a single top electrode and a single bottom electrode are necessary for operation. The bending motion results from the opposite effect of the electric field on each half of the piezoelectric element. This oppositely poled piezoelectric element embodiment is further discussed in U.S. patent application serial number[__/___,___, filed on even date herewith] 09/553,523, filed on April 20, 2000 by Murphy, Budde, Mangold, and Crane entitled "IN-PLANE SUSPENSION-LEVEL BENDING MICROACTUATOR FOR PRECISE HEAD POSITIONING," which is assigned to Seagate Technology, Inc., the assignee of the present invention, and is hereby incorporated by reference.

CLAIMS

1. (Amended) A microactuator for selectively altering a position of a transducing head carried by a slider in a disc drive system with respect to a track of a rotatable disc having a plurality of concentric tracks, the disc drive system having an actuator arm attached to a load beam for supporting the slider over the rotatable disc, the load beam having a stationary region and a moving region, the microactuator comprising:

means for flexibly coupling the stationary region of the load beam to the moving region of the load beam; and

means for selectively altering a position of the slider with respect to the rotatable disc, the means extending from [the] a distal end of the stationary region to a proximal end of the moving region generally along a longitudinal centerline of the stationary region.

5. (Amended) The microactuator of claim 4 wherein the [electroactive element] bending motor is constructed from a member of the group consisting of a piezoelectric material, an electroactive ceramic, an electroactive polymer, and an electrostrictive ceramic material.

6. (Amended) The microactuator of claim [3] 2 wherein the load beam has [a first section and] a second section[, the second section] connected to the flexure, and further wherein [the] a flexible beam is connected between the first section and the second section of the load beam and the bending motor is attached to the flexible beam.

8. (Amended) The microactuator of claim 7 wherein the electroactive [element] material is constructed from a member of the group consisting of a piezoelectric material, an electroactive ceramic, an electroactive polymer, and an electrostrictive ceramic material.

APPENDIX:
MARKED UP VERSION OF SPECIFICATION AND CLAIM AMENDMENTS

11. (Amended) The microactuator of claim 10 wherein the top electrode comprises:
a first top electrode element disposed on top of a first longitudinal half of the electroactive [material] <u>element</u>; and
a second top electrode element disposed on top of a second longitudinal half of the electroactive [material;] <u>element.</u>

13. (Amended) A disc drive suspension comprising:
an actuator arm having a proximal end and a distal end;
a load beam attached to the distal end of the actuator arm, the load beam having a mounting region at a proximal end, a head suspension near a distal end <u>of the load beam</u>, and a flexible region between the mounting region and the head suspension;
a flexure configured to support a transducing head;
a beam connected between the head suspension and the flexure [of the load beam]; and
a bending motor attached to a top surface of the beam such that the beam supports the bending motor and transforms a force on the flexure into a compressive load on the bending motor, the bending motor being deformable in response to a control signal applied thereto.